II. In the Claims:

The claims as submitted below are for the Examiner's convenience. No amendments have been made to the claims in response to the Office Action dated April 8, 2003. No new matter has been added.

1. (Original) A method of generating a map illustrating a set of characteristics of a cross section through an earth formation representing a time slice or a horizon through said formation in response to a plurality of scattered data observations on said cross section representing a plurality of parameters located at a plurality of locations on said cross section, comprising the steps of:

(a) gridding said cross section thereby generating a gridded cross section which includes a grid having a plurality of intersections and said plurality of scattered data observations distributed among the intersections of said grid on said cross section;

(b) obtaining a unique cumulative distribution function associated with each intersection of the grid of the gridded cross section thereby producing a plurality of cumulative distribution functions associated, respectively, with the plurality of intersections of said grid;

(c) choosing a value from each of the cumulative distribution function at each of the intersections of the gridded cross section thereby producing a plurality of values associated, respectively, with the plurality of intersections, and

(d) assigning each value to its associated intersection of the gridded cross section and assigning a unique color to said each value thereby generating a map illustrating said set of characteristics of said cross section through said earth formation.

2. (Original) The method of claim 1, wherein the obtaining step (b), for obtaining a unique cumulative distribution function associated with each intersection of the gridded cross-section, comprises the steps of:

(b1) Kriging the gridded cross section thereby generating a plurality of expected values and a plurality of corresponding standard deviations associated, respectively, with the plurality of intersections of the grid of the gridded cross section;

(b2) producing a probability density function associated with each expected value and each corresponding standard deviation generated from step (b1) thereby producing a plurality of probability density functions corresponding, respectively, to the plurality of intersections of the grid of the gridded cross section; and
(b3) producing a cumulative distribution function associated with each probability density function produced from step (b2) thereby producing a plurality of cumulative distribution functions corresponding, respectively, to the plurality of probability density functions which correspond, respectively, to the plurality of intersections of the grid of the gridded cross section.

3. (Original) The method of claim 2, wherein the choosing step (c), for choosing a value from each of the cumulative distribution functions at each of the intersections of the gridded cross section, comprises the steps of:
(c1) choosing a probability "(1-Pcu)" from each of the cumulative distribution functions.

4. (Original) The method of claim 2, wherein the choosing step (c), for choosing a value from each of the cumulative distribution functions at each of the intersections of the gridded cross section, comprises the steps of:
(c1) choosing a cutoff "Xp" from each of the cumulative distribution functions.

5. (Original) The method of claim 2, wherein the choosing step (c), for choosing a value from each of the cumulative distribution functions at each of the intersections of the gridded cross section, comprises the steps of:
(c1) choosing a lower limit from each of the cumulative distribution functions.

6. (Original) The method of claim 2, wherein the choosing step (c), for choosing a value from each of the cumulative distribution functions at each of the intersections of the gridded cross section, comprises the steps of:
(c1) choosing an upper limit from each of the cumulative distribution functions.

7. (Original) The method of claim 2, wherein the choosing step (c), for choosing a value from each of the cumulative distribution functions at each of the intersections of the gridded cross section, comprises the steps of:
(c1) choosing a spread from each of the cumulative distribution functions.

8. (Original) The method of claim 2, wherein the choosing step (c), for choosing a value from each of the cumulative distribution functions at each of the intersections of the gridded cross section, comprises the steps of:
(c1) applying an affine correction to each of the values chosen from each of the cumulative distribution functions associated with each of the intersections of the gridded cross section thereby choosing a plurality of corrected values corresponding, respectively, to the plurality of intersections of the gridded cross section.

9. (Original) The method of claim 8, wherein the assigning step (d), for assigning each value to its associated intersection of the gridded cross section and assigning a unique color to said each value thereby generating said map, comprises the steps of:
(d1) assigning each of said plurality of corrected values to its associated intersection of the gridded cross section and assigning said unique color to each said corrected value thereby generating said map illustrating said set of characteristics of said cross section through said earth formation.

10. (Original) The method of claim 9, wherein said corrected value is a probability "(1-Pcu)".

11. (Original) The method of claim 9, wherein said corrected value is a cutoff "Xp".

12. (Original) The method of claim 9, wherein said corrected value is a lower limit.

13. (Original) The method of claim 9, wherein said corrected value is an upper limit.

14. (Original) The method of claim 9, wherein said corrected value is a spread.

15. (Original) A program storage device readable by a machine, tangibly embodying a program of instructions executable by the machine to perform method steps for generating a map illustrating a set of characteristics of a cross section through an earth formation representing a time slice or a horizon through said formation in response to a plurality of scattered data observations on said cross section representing a plurality of parameters located at a plurality of locations on said cross section, said method steps comprising the steps of:

(a) gridding said cross section thereby generating a gridded cross section which includes a grid having a plurality of intersections and said plurality of scattered data observations distributed among the intersections of said grid on said cross section;

(b) obtaining a unique cumulative distribution function associated with each intersection of the grid of the gridded cross section thereby producing a plurality of cumulative distribution functions associated, respectively, with the plurality of intersections of said grid;

(c) choosing a value from each of the cumulative distribution function at each of the intersections of the gridded cross section thereby producing a plurality of values associated, respectively, with the plurality of intersections, and

(d) assigning each value to its associated intersection of the gridded cross section and assigning a unique color to said each value thereby generating a map illustrating said set of characteristics of said cross section through said earth formation.

16. (Original) The program storage device of claim 15, wherein the obtaining step (b), for obtaining a unique cumulative distribution function associated with each intersection of the gridded cross-section, comprises the steps of:

(b1) Kriging the gridded cross section thereby generating a plurality of expected values and a plurality of corresponding standard deviations associated, respectively, with the plurality of intersections of the grid of the gridded cross section;

(b2) producing a probability density function associated with each expected value and each corresponding standard deviation generated from step (b1) thereby producing a

plurality of probability density functions corresponding, respectively, to the plurality of intersections of the grid of the gridded cross section; and

(b3) producing a cumulative distribution function associated with each probability density function produced from step (b2) thereby producing a plurality of cumulative distribution functions corresponding, respectively, to the plurality of probability density functions which correspond, respectively, to the plurality of intersections of the grid of the gridded cross section.

17. (Original) The program storage device of claim 16, wherein the choosing step (c), for choosing a value from each of the cumulative distribution functions at each of the intersections of the gridded cross section, comprises the steps of:

(c1) choosing a probability "(1-Pcu)" from each of the cumulative distribution functions.

18. (Original) The program storage device of claim 16, wherein the choosing step (c), for choosing a value from each of the cumulative distribution functions at each of the intersections of the gridded cross section, comprises the steps of:

(c1) choosing a cutoff "Xp" from each of the cumulative distribution functions.

19. (Original) The program storage device of claim 16, wherein the choosing step (c), for choosing a value from each of the cumulative distribution functions at each of the intersections of the gridded cross section, comprises the steps of:

(c1) choosing a lower limit from each of the cumulative distribution functions.

20. (Original) The program storage device of claim 16, wherein the choosing step (c), for choosing a value from each of the cumulative distribution functions at each of the intersections of the gridded cross section, comprises the steps of:

(c1) choosing an upper limit from each of the cumulative distribution functions.

21. (Original) The program storage device of claim 16, wherein the choosing step (c), for choosing a value from each of the cumulative distribution functions at each of the intersections of the gridded cross section, comprises the steps of:
(c1) choosing a spread from each of the cumulative distribution functions.

22. (Original) The program storage device of claim 16, wherein the choosing step (c), for choosing a value from each of the cumulative distribution functions at each of the intersections of the gridded cross section, comprises the steps of:
(c1) applying an affine correction to each of the values chosen from each of the cumulative distribution functions associated with each of the intersections of the gridded cross section thereby choosing a plurality of corrected values corresponding, respectively, to the plurality of intersections of the gridded cross section.

23. (Original) The program storage device of claim 22, wherein the assigning step (d), for assigning each value to its associated intersection of the gridded cross section and assigning a unique color to said each value thereby generating said map, comprises the steps of:
(d1) assigning each of said plurality of corrected values to its associated intersection of the gridded cross section and assigning said unique color to each said corrected value thereby generating said map illustrating said set of characteristics of said cross section through said earth formation.

24. (Original) The program storage device of claim 23, wherein said corrected value is selected from a group consisting of: a probability "(1-Pcu)", a cutoff "Xp", a lower limit, an upper limit, and a spread.

25. (Original) An apparatus adapted for generating a map representing a cross section through an earth formation in response to a plurality of scattered observation data distributed throughout said cross section, said cross section representing a time slice or horizon through said formation, comprising:

first apparatus adapted for gridding said cross section thereby generating a first gridded cross section which includes a plurality of intersections and said plurality of scattered observation data distributed throughout said cross section;
second apparatus responsive to said first gridded cross section adapted for Kriging said first gridded cross section thereby generating a second gridded cross section having a plurality of intersections wherein each intersection of said second gridded cross section includes an expected value of a parameter and a standard deviation;
third apparatus responsive to said second gridded cross section for generating a plurality of cumulative distribution functions associated, respectively, with said plurality of intersections of said second gridded cross section; and
fourth apparatus adapted for selecting a plurality of values, respectively, from said plurality of cumulative distribution functions and for assigning said plurality of values and a plurality of unique colors to the respective plurality of intersections of said second gridded cross section thereby generating said map.

26. (Original) The apparatus of claim 25, wherein said third apparatus, for generating said plurality of cumulative distribution functions associated, respectively, with said plurality of intersections of said second gridded cross section, comprises:
probability density function generation apparatus adapted for generating a plurality of probability density functions associated, respectively, with said plurality of intersections of said second gridded cross section in response to the plurality of expected values and the plurality of standard deviations associated, respectively, with said plurality of intersections of said second gridded cross section;
cumulative distribution function generation apparatus responsive to said plurality of probability density functions adapted for generating said plurality of cumulative distribution functions from said plurality of probability density functions which are associated, respectively, with said plurality of intersections of said second gridded cross section.

27. (Original) The apparatus of claim 26, wherein each of said plurality of values selected, respectively, by said fourth apparatus from said plurality of cumulative

distribution functions, is selected from a group consisting of: a probability "(1-Pcu)", a cutoff "Xp", a lower limit, an upper limit, and a spread.

28. (Original) The apparatus of claim 26, wherein said fourth apparatus, adapted for selecting said plurality of values, respectively, from said plurality of cumulative distribution functions and for assigning said plurality of values and said plurality of unique colors to the respective plurality of intersections of said second gridded cross section, comprises:

correction apparatus adapted for applying an affine correction to each of said plurality of values selected, respectively, from said plurality of cumulative distribution functions thereby generating a plurality of corrected values corresponding, respectively, to said plurality of intersections of said second gridded cross section; and

assignment apparatus adapted for assigning said plurality of corrected values and a plurality of unique colors to the respective plurality of intersections of said second gridded cross section thereby generating said map.

29. (Original) The apparatus of claim 28, wherein each of said plurality of corrected values generated by said correction apparatus is selected from a group consisting of: a corrected probability "(1-Pcu)[corrected]", a corrected cutoff "Xp(corrected)", a corrected lower limit "lower limit (corrected)", a corrected upper limit "upper limit (corrected)", and a corrected spread "spread (corrected)".

30. (Original) A method of generating a cube illustrating a set of characteristics of an earth formation disposed within a cubic volume of earth, said cube including a plurality of cross sections, each cross section including a plurality of scattered data samples, each cross section being gridded and including a plurality of intersections, comprising the steps of:

(a) determining a plurality of cumulative distribution functions corresponding, respectively, to the plurality of intersections for each of said plurality of cross sections;

(b) selecting a value from each of said cumulative distribution functions thereby selecting a plurality of values corresponding, respectively, to said plurality of cumulative distribution functions for each of said plurality of cross sections;
(c) assigning said plurality of values, respectively, to said plurality of intersections for each of said plurality of cross sections; and
(d) assigning a plurality of unique colors, respectively, to said plurality of values assigned, respectively, to said plurality of intersections.

31. (Original) The method of claim 30, wherein the assigning step (c) comprises the steps of:
(c1) correcting each of the values selected from said cumulative distribution functions during the selecting step (b) thereby generating a plurality of corrected values; and
(c2) assigning said plurality of corrected values, respectively, to said plurality of intersections for each of said plurality of cross sections.

32. (Original) The method of claim 31, wherein the assigning step (d) comprises the steps of:
(d1) assigning a plurality of unique colors, respectively, to said plurality of corrected values assigned, respectively, to said plurality of intersections.

33. (Original) The method of claim 30, wherein the determining step (a), for determining a plurality of cumulative distribution functions, comprises the steps of:
(a1) determining a plurality of expected values and a plurality of standard deviations corresponding, respectively, to the plurality of intersections for each of said plurality of cross sections, an expected value and a standard deviation being associated with each intersection;
(a2) determining a plurality of probability density functions corresponding, respectively, to said plurality of expected values and said plurality of standard deviations for each of said plurality of cross sections, a probability density function being associated with each intersection; and

(a3) determining a plurality of cumulative distribution functions corresponding, respectively, to said plurality of probability density functions for each of said plurality of cross sections.

34. (Original) The method of claim 33, wherein each of the values, selected from each of said cumulative distribution functions during the selecting step (b), is selected from a group consisting of: a probability "(1-Pcu)", a cutoff "Xp", a lower limit, an upper limit, and a spread.

35. (Original) The method of claim 34, wherein the plurality of corrected values generated during the correcting step (c1) is selected from a group consisting of: a corrected probability "(1-Pcu)[corrected]", a corrected cutoff "Xp(corrected)", a corrected lower limit "lower limit (corrected)", a corrected upper limit "upper limit (corrected)", and a corrected spread "spread (corrected)".

36. (Original) A program storage device readable by a machine, tangibly embodying a program of instructions executable by the machine to perform method steps for generating a cube illustrating a set of characteristics of an earth formation disposed within a cubic volume of earth, said cube including a plurality of cross sections, each cross section including a plurality of scattered data samples, each cross section being gridded and including a plurality of intersections, said method steps comprising the steps of:

(a) determining a plurality of cumulative distribution functions corresponding, respectively, to the plurality of intersections for each of said plurality of cross sections;

(b) selecting a value from each of said cumulative distribution functions thereby selecting a plurality of values corresponding, respectively, to said plurality of cumulative distribution functions for each of said plurality of cross sections;

(c) assigning said plurality of values, respectively, to said plurality of intersections for each of said plurality of cross sections; and

(d) assigning a plurality of unique colors, respectively, to said plurality of values assigned, respectively, to said plurality of intersections.

37. (Original) The program storage device of claim 36, wherein the assigning step (c) comprises the steps of:

(c1) correcting each of the values selected from said cumulative distribution functions during the selecting step (b) thereby generating a plurality of corrected values; and

(c2) assigning said plurality of corrected values, respectively, to said plurality of intersections for each of said plurality of cross sections.

38. (Original) The program storage device of claim 37, wherein the assigning step (d) comprises the steps of:

(d1) assigning a plurality of unique colors, respectively, to said plurality of corrected values assigned, respectively, to said plurality of intersections.

39. (Original) The program storage device of claim 38, wherein the determining step (a), for determining a plurality of cumulative distribution functions, comprises the steps of:

(a1) determining a plurality of expected values and a plurality of standard deviations corresponding, respectively, to the plurality of intersections for each of said plurality of cross sections, an expected value and a standard deviation being associated with each intersection;

(a2) determining a plurality of probability density functions corresponding, respectively, to said plurality of expected values and said plurality of standard deviations for each of said plurality of cross sections, a probability density function being associated with each intersection; and

(a3) determining a plurality of cumulative distribution functions corresponding, respectively, to said plurality of probability density functions for each of said plurality of cross sections.

40. (Original) The program storage device of claim 39, wherein each of the values, selected from each of said cumulative distribution functions during the selecting step (b), is selected from a group consisting of: a probability "(1-Pcu)", a cutoff "Xp", a lower limit, an upper limit, and a spread.

41. (Original) The program storage device of claim 40, wherein the plurality of corrected values generated during the correcting step (c1) is selected from a group consisting of: a corrected probability "(1-Pcu)[corrected]", a corrected cutoff "Xp(corrected)", a corrected lower limit "lower limit (corrected)", a corrected upper limit "upper limit (corrected)", and a corrected spread "spread (corrected)".